

*Conservation Assessment  
for  
Henry's Elfin Butterfly (*Callophrys henrici*)  
(Grote and Robinson, 1867)*



*USDA Forest Service, Eastern Region*

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*This Conservation Assessment was prepared to compile the published and unpublished information on Henry's elfin and provides information to serve as a Conservation Assessment for the Eastern Region of the Forest Service. It does not represent a management decision by the U.S. Forest Service. Though the best scientific information available was used and subject experts were consulted in preparation of this document, it is expected that new information will arise. In the spirit of continuous learning and adaptive management, if you have information that will assist in conserving Henry's elfin, please contact the Eastern Region of the Forest Service - Threatened and Endangered Species Program at 310 Wisconsin Avenue, Suite 580 Milwaukee, Wisconsin 53203.*

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## EXECUTIVE SUMMARY

Henry's elfin butterfly (*Callophrys henrici*) is a North American Lycaenid found east of the Dakotas and central New Mexico, and into the neighboring portions of Mexico and Canada. Six subspecies have been described and serve to primarily characterize the variations in wing coloration that distinguish regional populations. Some of the subspecies correspond to regional variations in larval foodplant. Larvae feed on either holly (Aquifoliaceae: *Ilex* sp.) or redbud (Fabaceae: *Cercis canadensis*) across most of the range and members of eight additional plant families have been confirmed or suggested as larval hosts including European buckthorn (Rhamnaceae: *Rhamnus frangula*) verified repeatedly in Ontario and Massachusetts. Henry's elfin is a forest and open woodland species throughout the range and may be found in pine/oak barrens, shrublands, and pine/oak woods on sandy, acidic, calcareous, or rocky soils. It may inhabit rich, mesic forest on clay soils and edges of conifer swamps or acidic bogs. The species is ranked globally secure but eight states and New Brunswick give it Special Concern status. Seven states and two provinces have no information with which to rank the species and four others rank Henry's elfin SU, possibly in peril but status uncertain. The butterfly is small, brown, and highly localized and may not appear on transect surveys, the most common method of statewide butterfly monitoring. Conversion of habitat to pine plantation, development, and canopy closure may reduce habitat in the southern portion of the range. Gypsy moth spraying, fire suppression, prescribed burning, and conversion to commercial cranberry operations may negatively affect habitat or the species in the north. Research on habitat and larval foodplant is critical to identify threats, assess abundance, and assign status in the north and northeastern portions of the range. There are 18 occurrences for the species in Minnesota, Wisconsin, and Michigan reported within the last 25 years.

## ACKNOWLEDGMENTS

Numerous people across the range of Henry's elfin contributed to this conservation assessment. I must acknowledge particularly Chris Durden and Charles Bordelon for helping me understand the habitats and overlapping ranges of the subspecies in the state of Texas, Ron Gattelle for clarifying the distinctions between subspecies in the southeast, and Jean-Denis Brisson for understanding my French and sharing his memories of Henry's and habitat in Québec. I greatly appreciate the willingness of lepidopterists to share their wealth of knowledge and personal observations of Henry's elfin, particularly Steve Spomer, Randy Emmitt, Ron Huber, Les Ferge, Jim Wiker, Ron Royer, Mo Nielsen, Dale Schweitzer, Matt Brust, Derek Bridgehouse, and Alan Gregory. Valuable information and connections were provided by the following government employees from their respective government winter cubbyholes: Betsey Ray- Pennsylvania, Kristin Westad-Wisconsin, Susan Dees-Illinois, William Busby-Kansas, Michael Nelson-Massachusetts, Harry LeGrand-North Carolina, Ed Schools-Michigan, Robert Dana-Minnesota, Dave McShaffrey-Ohio, Bill Watkins-Manitoba, Janet Sternberg-Missouri, Jeff Hajenga-West Virginia and Sean Dunlap of the Ottawa National Forest and Kenneth Ennis of the Huron-Manistee National Forest. Thank you to The International Lepidoptera Survey (TILS), a non-profit scientific organization in South

Carolina, for staff assistance. Comments that have significantly improved this document came from Ron Huber, Kenneth Ennis, Dale Schweitzer, and Chris Durden.

## NOMENCLATURE AND TAXONOMY

<b>Species Name:</b>	<i>Callophrys henrici</i> (Grote and Robinson, 1867)
<b>Common Name:</b>	Henry's Elfin, Woodland Elfin (Scott, 1986)
<b>Order:</b>	Lepidoptera
<b>Family:</b>	Lycaenidae
<b>Subfamily:</b>	Eumaeinae
<b>Synonyms:</b>	<i>Deciduphagus henrici</i> (Grote and Robinson, 1867) Johnson, 1992. <i>Thecla henrici</i> Grote & Robinson, 1867 [Original description] <i>Incisalia henrici</i> (Grote & Robinson, 1867) [authors, incl. Scudder, 1872] <i>Thecla irus</i> Godart [1824], by Boisdual and LeConte, 1833. [misident.]

The family Lycaenidae includes the hairstreaks, coppers, blues, and the harvester. The name hairstreak is applied to members of the subfamilies of the Lycaenidae that have tailed hindwings. About half of the 2,000 known species of hairstreaks occur in the Americas with seventy-five species in North America (Scott, 1986) known commonly as hairstreaks and elfins. With the exception of two western species (*Hypaurotis crysalus* and *Habrodais grunus*), which belong to the subfamily Theclinae, adult hairstreaks may be separated from all other North American Lycaenidae by the presence of only ten forewing veins instead of eleven, and with none of the three R veins branched. These belong to the subfamily Eumaeinae. In some species, the male forewing may have a stigma or scent patch, which is lacking in the other subfamilies (Scott, 1986). *C. henrici* is one of the exceptions, that is, lacking a stigma.

As taxonomic trends ebb and flow over the decades with each new generation of “lumpers” or “splitters” and new means of collecting data become available, the discussions of proper nomenclature to best describe the populations are renewed. Taxonomic questions regarding Henry's elfin are many. At this time, there is universal agreement that there is a species *henrici*. Some adhere to a division of the southwestern populations into two species, *henrici* and *solata* (Durden, 1990). *Incisalia solatus* was described as a species in 1909 from Blanco Co. Texas (Cook and Watson, 1909). The name *Thecla irus* for this elfin derives from a case of mistaken identity, which is clarified in Gatrell, 1999.

Kurt Johnson has taken a broad perspective and studied the morphological attributes of all holarctic Theclinae, concluding the genus name for Henry's elfin is *Deciduphagus* (Johnson, K. 1992). Johnson studied the type specimens for *Callophrys* within this context and

concluded that *Callophrys* is a genus name best applied to hairstreaks and defies the inclusion of elfins. Johnson divides the elfins worldwide into two groups on the basis of larval food plants, the conifer-feeders and those that feed on deciduous trees and shrubs, a distinction supported by morphological studies (1992). The name *Incisalia* is reserved for Pinaceae-feeders (Johnson, K. 1992) and *Deciduphagus* for the latter.

Most lepidopterists across the range of Henry's elfin continue to use the name of *Callophrys* or *Incisalia* to identify the genus, which includes *henrici*. NatureServe and the North American Butterfly Association (NABA) use *Callophrys* as does the newest Scientific Names List for North American Butterflies (Opler and Warren, 2002). I will use *Callophrys* in this paper based on these authorities and common usage.

The recognition of subspecies is another area of conflict between taxonomists, landing one in the murky area of clines, races, blend zones, phylogenetics, and now molecular genetics. The separation of subspecies of *henrici* is based on geography, and variations in wing markings and color. In most cases these are concordant with foodplant use. Henry's elfin butterflies are polyphagous across the range, but in most cases are monophagous (feed on plants within the same genus) or oligophagous (feed on several plants in the same or closely related families) regionally. The plant families used by the larval stages of *henrici* are quite distinct from each other and the evidence for sub-speciation on this basis is compelling. Butterflies that are widespread with different larval hostplants in different areas are most likely to speciate after prolonged isolation and Opler names *henrici* as one of two eastern species most likely to follow this pattern (Opler and Krizek, 1984). Gross morphology appears to be the weaker determinate of distinction but is the primary basis of the subspecies. The use of different hostplants is not tied closely enough to geography to make the case for sub-speciation on that basis.

In this paper I have chosen to recognize all six subspecies to better facilitate the discussion of larval foodplants across the range of the species. Subspecies *solatus* recognized as species *C. solata* (Durden, 1990) can be further divided into the nominotypical and a second *C. solata* subspecies in southern New Mexico. The *solatus* butterflies use a range of foodplants unlike any of the others and may be found to be truly polyphagous in their region. The species *C. henrici* may at some point be described as a complex of two or three sibling species that absorb the described subspecies (Schweitzer, D.) although the results of a recent feeding study by Pratt and Pierce (2001) do not support this contention.

#### **SUBSPECIES**

*C.h. viridissima* Pavulaan 1998 TL Bodie Island Lighthouse, Nag's Head, Dare Co. NC

*C.h. turneri* Clench 1943 TL Cowley Co. KS

*C.h. henrici* (Grote and Robinson, 1867) TL Philadelphia, PA

*C.h.yahwehus* Gattelle 1999 TL Orangeburg Co. SC

*C.h. solatus* Cook and Watson 1909 TL Blanco Co. Texas

*C.h. margaretae* dos Passos 1943 TL Deland, Volusia Co. Florida

NABA does not recognize subspecies of *henrici* (NABA 2001), but NatureServe recognizes *C.h. solatus* from Texas and southern New Mexico (NatureServe, 2002). A population in the adjacent Mexican state of Coahuila is also included in subspecies *solatus* (Durden, 1990). NatureServe also recognizes populations in central Florida and perhaps southern Georgia as subspecies *C.h. margaretae*. Recently *C.h. viridissima* was described from populations on the upper outer banks of North Carolina (Pavulaan, 1998) *C.h. yahwehus* has been described from populations in southern South Carolina and possibly extends into northwestern Florida and west to Mississippi (Gatrelle, 1999). *C.h. turneri* ranges across the central and southern Midwest from the eastern parts of Texas, Oklahoma, Kansas, and Nebraska; across Missouri, Louisiana, southern Illinois, and Indiana. The populations from central and east Texas feed on holly and may be segregated from *C.h. turneri* as an additional undescribed subspecies (Durden, i.l.) Geographical separation of these groups leaves the range of nominotypical *henrici* from southeastern Manitoba through northern Minnesota, Wisconsin, and Michigan, across southern and eastern Ontario, southwestern Quebec, and into maritime Canada and northeastern United States at least as far as southern New Jersey, West Virginia, and southern Ohio. See Appendix A: Subspecies by State.

## DESCRIPTION OF SPECIES

Henry's elfin is a small butterfly (wingspan (20) 25-32 mm) with a hindwing tail. The dorsal surface is dark brown. It may have a dull orange coloration at the outer margin of the forewing and near the tail of the hindwing. Unlike other elfins, the male does not have a forewing scent patch. On the underside of both forewing and hindwing, the basal area is darker than the outer portion. The postmedian line is edged in white and almost straight on the forewing. Inside the white line on the hindwing is a dark brown edge. Photo: Harry Darrow



Fully-grown larvae are slug-shaped and about one centimeter in length (Klassen, et al. 1989). Larvae are typically light green with a pale middorsal stripe and oblique pale comma-shaped side stripes. Some larvae may be red-brown with paler brown stripes. All larvae abruptly change to reddish-brown a few days prior to pupation (Layberry et al, 1998). The pupa is orange brown, mottled with brown to black, the abdomen broader than that of other species (Scott, 1986).

## LIFE HISTORY

### Immature Stages

Female *henrici* lay white, echinoid eggs singly on the larval food plants. Eggs hatch in 7-11 days (Gifford and Opler, 1983). On redbud (*Cercis canadensis*) the eggs have been found between the bud and the leaf axil or on the flowers, flower buds or developing leaf buds (Iftner, et al. Photo: Can.FieldNat.112(2): cover



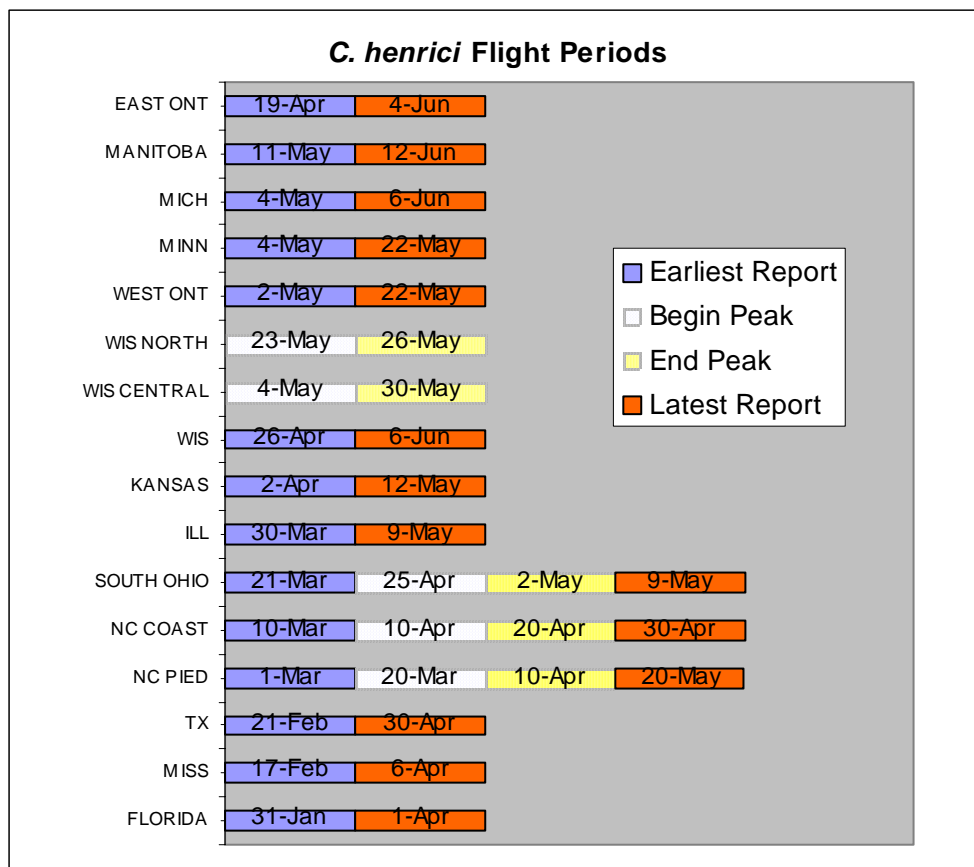
1992). The newly hatched larvae bore into the buds and, as they grow, eat the flowers, young leaves, and fruit. Eggs found on glossy buckthorn (*Rhamnus frangula*) have been located between flower bud and twig, in leaf axils, or simply near buds (Caitlin, et al. 1998). Eggs are laid on developing flower buds of maple-leaved viburnum (*Viburnum acerifolium*) in Michigan (Nielsen, M.C.).

When the larval foodplant is an evergreen holly (*Ilex* sp.), the eggs are laid singly along the midrib of a leaf from the past season or on leaf buds on upper branches. Pratt and Pierce suggest that oviposition on old leaves that require young larvae to travel to fresh leaves may be an adaptation to escape parasitization by insects that attack eggs clustered about young leaf buds (2001).

The eggs hatch in 7-11 days and larvae feed on, or bore into, new leaf buds. As they grow through three molts, they eventually skeletonize entire leaves (Gifford and Opler, 1983). Pavulaan found an ovum on the underside of a leaf near the leaf edge (1998). Durden reports the eggs found on *Sophora secundiflora* near Austin, Texas to be hidden between the calyx and corolla (31 Jan.). Larvae in Manitoba are said to bore into the flower buds and fruit and eventually feed on the leaves of *Vaccinium* sp. (Klassen, et al. 1989).

The larval stage lasts up to four weeks during which the animals move about very little. Under laboratory conditions, larvae have been found to develop in from 16 to 19 days (Pratt and Pierce, 2001). On Roanoke Island, NC, older larvae feed at night and rest beneath year-old leaves during the day (Gifford and Opler, 1983). Layberry (1988) found that the larvae he observed on *Rhamnus* flowers and leaves pupated after 25-27 days. Subsequent research showed that larvae emerged as adults after 35-40 days (Catling, et al. 1998). Larvae are believed to crawl to the ground and pupate under leaves at the base of the hostplant where they overwinter. Pupae are vulnerable to fires as they are definitely not underground (Schweitzer). There is no evidence of association with ants.





**TABLE I.** Flight Period

*C. henrici* is univoltine throughout its range. Adults begin to fly in late January (Gatrelle, 1999) or February in the southern part of the range and not until nearly three months later in Manitoba (Table I). Within a region, emergence is highly dependent on weather variables. Peak flight in Wisconsin usually occurs between 23 May and 26 May in northern Wisconsin. Butterflies fly slightly later in the bog areas (May 28). In central Wisconsin *henrici* peak flight can occur between May 4 and May 30 (Swengel and Swengel, 2000). Henry's elfin begins to fly about one week later at sites in Michigan (Nielsen, 1999). The earliest observation in Minnesota was recorded on 4 May 1980 (Huber, R.). In New Jersey adults can be found most years through a 4-6 week period with female stragglers much longer, to a maximum of 8 weeks (Schweitzer, 2003).

## Behavior

Swengel describes the flight of Henry's elfin as fast and erratic. The adults are easily flushed from a distance and difficult to track (1994). Pavulaan describes the daily activity of the species on the Outer Banks of North Carolina (1998). Beginning about 10:00 AM EST, activity of adults is focused closely around the host trees and continues for about two hours then drops off suddenly. Both sexes perch on the ends of prominent branches, sallying out to fly at others and perform territorial aerial displays. The adults avoid the shade of the canopy trees.

In New Jersey adults are recorded active again in early afternoon. In late afternoon males rest on holly branches or on other evergreens, presumably awaiting passing females. Henry's elfins choose shrubs or small trees up to 15 m tall and perch up to about 2 m above the ground, though they have been observed on pine trees and *Ilex opaca* trees from 5-10 m above the ground (Borth, 1997; Schweitzer; Gattelle, 1999). Nectaring is often in the canopy when red maple is used. They can be easily missed without an extension net or long branch for flushing. They may be found perching on twigs close to the ground and regularly sip moisture from wet soil where they may be seen along roads and trails in the woods. Swengel has observed that individuals fly skyward when disturbed (2001), or horizontally where the larval host is a short shrub (Swengel and Swengel, 1994). Collections of males are sometimes found on low ridges above bogs "as if selecting a 'favored' perching location." (Balogh, G.). Locations of concentrated "lekking" areas are often hard to predict, resulting in a false impression that adults are scarce (Schweitzer). In the southwest, Henry's is the only elfin flying before the leaves are on the trees, though in most areas it is said to start with or slightly later than other elfins. In Nova Scotia it has been reported flying with brown elfin (*C. augustinus*) in bogs and with hoary elfin (*C. polios*) in dry areas (Bridgehouse, D.). In northern Wisconsin dry forest/barrens habitat, associates include eastern pine elfin (*Incisalia niphon*), *C. augustinus*, *C. polios* and Spring Azure (*Celastrina ladon*) (WDNR NHI, 2003, Borth et al. 1997).

In central Wisconsin, Henry's has been seen more than once in mid-May at the same site with the frosted elfin (*C. irus*) (Swengel and Swengel, 1994). In Manitoba, it may be found in the jackpine forests with *Incisalia niphon*, *C. augustinus* and *C. polios* (Royer, R.). In South Carolina they are found with *I. niphon* (Gattelle, R. 31 Jan.). In central Texas *C. h. turneri* and *C. solatus* may be found together at nectar sources (Durden, 1990). In southern New Jersey it usually occurs with low numbers of *I. niphon* and occasionally with *C. augustinus*. It does not normally occur in habitats suitable for *C. polios* or *C. irus* there (Schweitzer).

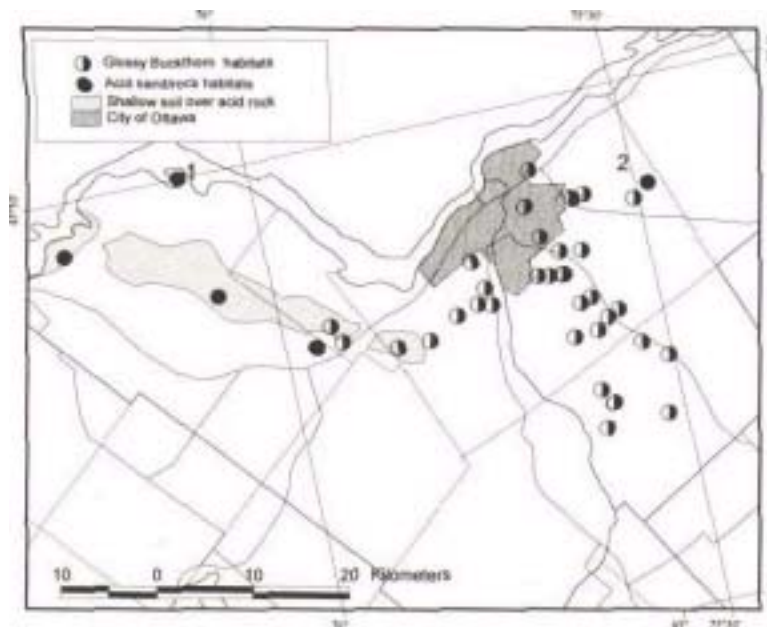
## Nectar Sources

Nectar sources vary across the range. In Texas, those butterflies using Texas persimmon (*Diospyros texana*) as the larval food plant are often found nectaring on swamp privet (*Forestiera* sp.), a small tree related to ash (*Fraxinus* sp.). As additional plant species flower, the butterflies move onto redbud (*Cercis canadensis*), Mexican buckeye (*Ungnadia speciosa*), agarita (*Mahonia* spp.), and Texas persimmon. East Texas butterflies are highly attracted to the flowers of laurel cherry (*Prunus caroliniana*) (Bordelon, C.). On the North Carolina coast, holly-eaters nectar on black willow (*Salix nigra*), highbush blueberry (*Vaccinium corymbosum*), sassafras (*Sassafras albidum*), and black cherry (*Prunus serotina*) (Pavulaan, 1998) and in the Piedmont the larval foodplant is said to be holly and the butterflies nectar on blueberry and redbud (Emmitt, 2002). In southern New Jersey adults eclose so early that for the first week or two, red maple is the only available flower. Later, highbush blueberry is most used but others like *Aronia*, *Sassafras*, and persimmon are used if present. *Rhamnus* and blueberry appeared to be the main nectar flowers around Boston (Schweitzer, D.). In northern Florida, they are reported nectaring on the flowers of wild plum (*Prunus* sp.) or hawthorn (*Crataegus* sp.). In South Carolina and Georgia, adults are found

nectaring on redbud but no evidence of oviposition on these plants has yet been forthcoming, leading to the conclusion that they are holly-eaters (Gatrelle, 1999; Scudder, 1889). Gatrelle finds adults nectaring on plum blossoms in coastal South Carolina (Gatrelle, R.13 Jan). In Michigan, the butterflies using *Viburnum acerifolium* as a larval foodplant have been observed nectaring on chokecherry *Prunus virginiana* (Nielsen, 1985). In the red pine – jack pine sand barrens of the Ottawa Valley (Durden, i.l.) of Ontario (Campbell's Bay, #1 on map below) and Quebec (Kazabazua) the butterflies nectar on blueberry and wild cherry (*Prunus* sp.)

## Dispersal/Migration

North American hairstreaks rarely migrate and there is no information to indicate that Henry's elfin does so. Hairstreaks are known to be swift, erratic fliers but typically don't fly far. Male *henrici* appear before the females in spring and are more localized, staying within their chosen mating areas. In New Jersey, Schweitzer reports the females to be dispersive late in the season and newly eclosed adults may be found out of the mating areas (Schweitzer, D.) but the extent of this dispersal is unknown and he notes that he has not seen such late season adults more than about a kilometer from holly. Isolated hollies a few hundred meters out of habitat commonly host larvae and occasionally a few adults. New Jersey females range widely within contiguous forests but appear reluctant to leave forests and are almost never seen in open pine barrens, scrub, old fields, or populated areas and usually do not turn up in powerline rights-of-way with other elfins. They do cross 2 lane roads readily if the other side is forested (Schweitzer, D.). There are no studies in the literature on dispersal of Henry's elfin. Some lepidopterists have noted that the butterflies may suddenly show up one year at sites that had been monitored for many years prior with no occurrences recorded (Balogh, G.; Kons, 1997) and the species may appear in its habitat in large numbers some years but not in others (Handfield, 1999). The opposite was observed in southern New Jersey where it has been widespread and common to abundant annually from 1990-2002 but was much scarcer in 1989 (Schweitzer D.). It was also common in several earlier years like 1974 and 1975. It appeared fairly consistent in numbers in the Boston area.



This map of Henry's populations in the Ottawa area from Catling, et al. 1998, is illustrative of the habitat complexity that has made it difficult to clearly identify the requirements of the butterfly in the north. #1 is a population in native pine/oak savanna. #2 is a natural habitat at the forested edges of a bog. The half-filled circles indicate occurrences of the butterflies that have spread across the intervening area by

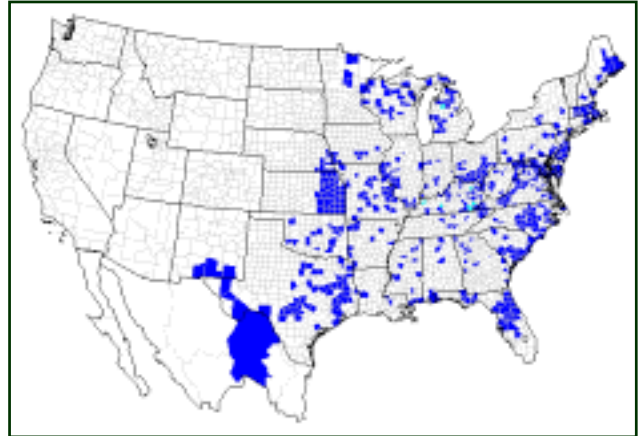
using *Rhamnus frangula* in abandoned farm fields.

## DISTRIBUTION

### Range-wide Distribution

#### United States and Mexican

**Distribution:** 35 states east of the Rocky Mountains, exceptions are the Dakotas and Vermont. One site is in the state of Coahuila, Mexico.



### Canadian Distribution



Manitoba  
Ontario  
Quebec  
New Brunswick  
Nova Scotia

## HABITAT AND LARVAL FOOD PLANTS

### Range-wide

Throughout the range, Henry's elfin may be found in wooded habitat. The degree of "wood" in the habitat varies and the habitat may be sandy, dry, and open or very wet, acidic, bog habitat within large tracts of forest. Some communities on the dry end of the spectrum are xeric woodlands with brushy understory, pine and oak barrens, scrub, overgrown clearcuts in jackpine or pitchpine forest, aspen glades, dry oak savannas, hill prairies and bluffs, chaparral, mesquite woodlands, and scrublands. Mesic forest types dominated by oaks, maples, and hickories with dogwood and redbud in the understory on clay in the south or thin calcareous soils over limestone bedrock in the north and southwest, characterize the habitat of the species in the rich forests of the eastern U.S. Wet communities include the flatwoods

of the southern coastal plains, pocosins, riverine forests, bottomland forests, sphagnum bogs, shrubby bogs and marshes, and tamarack/ black spruce swamps. Usually pine and evergreen shrubs are important elements of the community. In woodlands, the elfins are most often seen along trails, powerline cuts, and other openings.

Within a given geographical region of the range, *henrici* is monophagous, usually using only a single food plant. However, there are discrepancies in this assumption, which will be explored further in the regional discussions. In Wisconsin and Minnesota the food plant has not been determined. In Ontario, the butterflies have been found recently using an exotic, Glossy Buckthorn. In the Philadelphia area, the type location for the species, the food plant has not been identified and within a few miles are populations using redbud and others using holly. North Carolina butterflies primarily use holly but the largest population in the state is found on redbud trees with few hollies nearby (larvae are yet to be observed) (Emmitt, R. 31 Jan).

Other oddities are a population on *Lupinus texensis*, Texas bluebonnet, in Llano County, Texas (Durden, C.) and possibly some holly-eaters on a river island in Pennsylvania (Ray, B.). A location in central Rhode Island is in a hardwood wetland with no holly or redbud present anywhere in the area (Gatrelle, R.). In most cases larval observations are lacking and adults may be reported from outside the mating habitat. Observation of only one or two individuals is probably not sufficient to identify the habitat (Schweitzer, D.). Many plants have been suggested as larval food plants but only a few have been used to raise larvae to adults. See Appendix B.

## Western

West of the Mississippi River, Henry's elfin habitat is described as deciduous forest, woodland or woodland edge. Nebraska sites are in oak/hickory communities in heavily forested areas of the eastern part of the state where *Cercis canadensis* is part of the understory community. The butterfly has been found in wooded habitat on river bluffs in Nebraska, Oklahoma, and Missouri. The Missouri habitat is open forest with nearby brushy areas. In both Nebraska and Missouri, Henry's may be using wild plum (*Prunus sp.*). One Nebraska site is moist forest with many elms, a creek running through, and no redbud present (Spomer, S.). In Kansas, the species reaches west to 97degrees west longitude where the eastern deciduous forest community, including redbud, is halted by the drier conditions of the Great Plains (Ely et al, 1986). *Vaccinium* has been reported as a foodplant in "The Butterflies and Moths of Missouri" (Heitzman and Heitzman, 1987) but it is not clear that the plants are actually used in that state. Note: Many references have listed *Prunus* and *Vaccinium* as foodplants but there is no solid evidence at this time that these plants are used by Henry's elfin anywhere in the range.

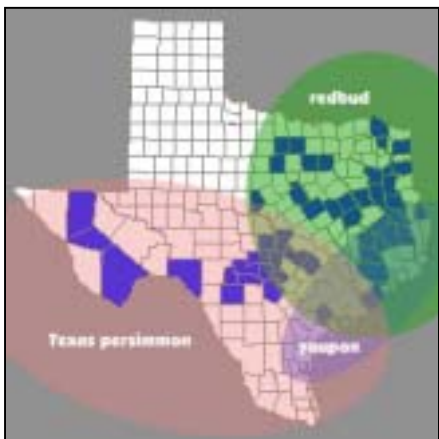
In the southwest, Henry's elfin inhabits mesquite woodland (Scott, 1986) and damp ravines in woody scrub (Nature Serve, 2003). In Texas, redbud extends west to approximately the

Western	Rank
Nebraska	S2
Iowa	S3
Kansas	S3
Missouri	S4
Oklahoma	S?
Arkansas	S?
Louisiana	SU
Texas	S?
New Mexico	S?
Coahuila, Mexico	



middle of the state. *C. h. turneri* feeds on Texas redbud, (*Cercis canadensis* var. *texensis*) in Smith County in the northeastern corner of the state. The habitat is consistent with the oak/hickory uplands of the states to the north and includes both yellow pine (*Pinus echinata*)/blackjack oak (*Quercus marilandica*) forests and, on wetter sites, loblolly pine (*Pinus taeda*)/sweetgum (*Liquidambar styraciflua*) forests. At least one *C. henrici* population in central Texas is reported by Durden to feed on *Lupinus texensis*, Texas Bluebonnet, another member of Fabaceae, the legume family.

Central Texas has both *C. h. turneri* in habitats with redbud and *C.h.solatus* using primarily



Texas mountain laurel (*Sophora secundiflora*) and Texas persimmon (*Diospyros texanum*). These plants are not found in the northern third or the eastern quarter of Texas. *Callophrys solatus* was described from the Austin area in central Texas (Cook and Watson, 1909) and is still considered a separate species by Texas lepidopterists (Durden, 1990). This butterfly is also recorded from southern New Mexico (Ferris, 1980) and from the Serranias del Burros, Coahuila, Mexico west of Del Rio, Texas where it likely uses the same larval foodplants. Durden reports that *C. solatus* may use Mexican buckeye (*Ungnadia speciosa*) or even *Verbena* sp. when the

preferred host flowers are hit by late frost (Durden, 2003). *C. solatus* does not appear to range further north or east of Williamson County in the center of the state, which is consistent with the range of Texas mountain laurel.

Although redbud range extends into southeastern Texas, the butterflies in that area are associated with yaupon (*Ilex vomitoria*), which occurs in dense amounts as a dense understory species in the mixed forests of loblolly pine and oak and in the post oak/hickory belt. Henry's elfins are also seen on the flowers of blackberry, white violet, hawthorn (*Crataegus* sp.), and Mexican plum (*Prunus mexicana*) (Bordelon, C.). If the larval foodplant is yaupon in this area of Texas and nearby Louisiana, this might be a range extension for Gattelle's subspecies *yahwehus* as no other *Ilex*-eating Henry's elfins are nearby. Other possibilities are a new subspecies or *Ilex*-eating *turneri* in areas where redbud is absent or uncommon.

## Central

Henry's elfin is conspicuously absent from northern Illinois, Iowa, and southern Wisconsin where the native range of *Cercis canadensis* ends. However, it is also unrecorded from northern Indiana, northwestern Ohio, and southern Michigan where redbud is a native species but uncommon. One possible explanation for this is that the Prairie Peninsula that extended across the area during the Hypsithermal Period after the Wisconsin glaciation, created a barrier to the butterfly. Redbud is found on soils created from prairie as well as forest-derived soils indicating that the plant was able to survive in very dry, open

Central	Rank
Illinois	S4
Indiana	S?
Ohio	SU

grassland situations. The butterfly, in this scenario, would have reached the glaciated portions of the Midwest from around the eastern edge of the prairie through eastern Canada.

In southern Illinois, Henry's is reported from open oak/hickory and pine/oak woodlands with redbud usually near streams or rivers. The Illinois Butterfly Monitoring Network covers 125 location in the northern 2/3 of the state and Henry's elfin has been reported once since 1987 as an unverified sight record from Cook County in the northeastern corner of the state (Taron, D.). Similarly, monitoring across the state of Ohio at 60 sites for the past six years has resulted in only one report from southern Ohio where the butterfly is to be expected. However, the species has been reported for the last two years from Erie County in the north. The site is an abandoned limestone quarry, heavily forested around the edges with a prairie remnant, brushy woods, and ponds. This site is within the Erie Metroparks System (Wiedmann, J.). Erie County is east of the range of redbud (See Appendix C. Information on some larval food plants) but not by far. Habitat in southern Ohio is described as woodland edges and openings and xeric prairies surrounded by cedar glades (Iftner, et al. 1992) and redbud is the usual foodplant there. One site in the foothills of the Appalachians is a ridgetop corridor of shrubby, abandoned orchard within a large area of hardwood forest where the butterflies use redbud as the larval foodplant (Zickefoose, J.).

### Appalachian and Northern Piedmont

One site in eastern Pennsylvania is a small (0.5 A.) open grassland on the edge of woodland, another is a hillside covered by mature red cedars (similar to overgrown xeric prairies of the Midwest) and with rich hardwood forest on the northwest, a third site is also a wooded hillside with various successional stages of oaks and scattered grassy openings (Ray, B.) All these could be characterized as forms of savanna. The sites are underlain with calcareous bedrock including traprock and support redbud. At Philadelphia, PA., type locality for the species, the hostplant is uncertain. Redbud was almost certainly the primary host in southern PA. but "wild plum" (reported as *Prunus pennsylvanica*) has also been reported as a host in eastern Pennsylvania where at least one of the two sites is well beyond the range of redbud (Shapiro, 1966). In northeastern Pennsylvania the habitat is pitchpine (*Pinus rigida*)/scrub oak and "the species is most abundant where this habitat has been burned within the past 50-60 years" (Gregory, A.). Neither holly nor redbud occurs in this region. Historically, the coal miners families would burn to increase blueberry/huckleberry harvests. In West Virginia, where redbud is known to be the primary foodplant (Allen, 1997), the habitat is described as dry woodland areas with redbud. Consistent with the nature of *Cercis canadensis*, "this is often an area that has been cut and then overgrown". Most West Virginia sites are in the eastern panhandle.

Appalachian	Rank
Pennsylvania	S1S3
Western Virginia	S4
West Virginia	S4
Kentucky	S4
Tennessee	S5

## Great Lakes

In Canada and the northern U.S., Henry's elfin inhabits the Canadian Mixed Deciduous Woodland Zone characterized by beech, maple, oak, and red and white pine. The woodlands may be deciduous and mesic in character or dry, open pine woodlands (Can. BIF, 2003). In eastern Canada, LaPlante considers Henry's elfin a butterfly that lives in acid and sphagnum bogs dominated by tamarack and black spruce and surrounded by ericaceous plants. He includes *henrici* as a denizen of the same habitats as the bog butterflies: Jutta arctic (*Oeneis jutta*), brown elfin (*C. augustinus*), bog fritillary (*Boloria eunomia*), and bog copper (*Lycaena epixanthe*) (LaPlante, 1985). Of the known foodplants, *Ilex* (*Nemopanthus mucronata*) or *Vaccinium* are the most likely host plants in these areas.

Great Lakes	Rank
Manitoba	S4
Ontario	S4
Quebec	S?
Minnesota	S?
Wisconsin	S2
Michigan	S2

In Québec, habitat is described as deciduous, open woods with *Vaccinium angustifolium*, *Gaylussacia baccata*, jackpine (*Pinus banksiana*) and red pine (*P. resinosa*) near Ottawa or white pine (*Pinus strobus*) near Montréal on dry, rocky, or acidic soils. Alternatively, the species may be found in moist forest or bog. Larvae (les chenilles) use mountain holly (*Ilex* (*Nemopanthus mucronata*)) in eastern Québec (Handfield, 1999) but use of blueberry or any other foodplant is yet unverified in the province. Anecdotal information suggests that the butterflies have been known from areas where wildfires have caused the blueberries to flourish and flower (Brisson, J-D.). In Ontario the habitat is “bog fringe forest”, oak/pine savanna, and “rock barrens” with exposed granite or sandstone. *Vaccinium* sp. is reported as the larval foodplant in Ontario (Holmes, et al. 1991) but Richard Westwood has stated that plum is a favored host plant in southern Ontario. The habitats near Ottawa where the species has begun to use *Rhamnus frangula* are within areas already supporting the butterfly in natural habitats. The newly populated areas are on abandoned farmland in openings in buckthorn thickets or woodland clearings with *Populus* sp. and white cedar (*Thuja occidentalis*) (Catling, et al., 1998).

In the western portion of this region, Henry's observations are reported most often from dry areas. Reports from Minnesota are from openings in oak forest or jackpine barrens. One female was collected in Minnesota on blueberry in jackpine/oak barrens (Huber, R.). Wisconsin populations have been found in the Wisconsin central sands jackpine/oak barrens region and in the northwestern corner of the state in oak-pine scrub forest/barrens mosaic habitat. Both these areas are a complex of sandy jackpine and/or oak barrens, dry pine/oak woodlands, and sphagnum bogs and marshes. Individual sites have been described as “large barrens/brush prairie”, “scrub oak/jackpine woods”, and “prairie opening bordered by pine/oak forest and marsh” (WDNR NHI, 2003). The species has been found in concentrations within extensive heath-covered forest/barrens habitat but never on frequently burned barrens (Kons and Borth, 1997). In contrast, sites with open barrens and closed forest have Henry's in very small numbers. Swengel has stated that Henry's elfin should be sought in areas with abundant heaths (1994). Adults were observed resting on branches of wild



cherry within white pine/red maple/oak forest on sandy, acidic soils in the center of Wisconsin (Brust, 2003). The site is within the “Tension Zone” between northern forest habitat and the southern prairie/deciduous forest. *Vaccinium* is present at the site.

Henry’s elfin has been found on or near serviceberry, *Amelanchier* sp., a shrubby genus in the same family as *Prunus*, in northwestern Wisconsin and adjacent Minnesota (Huber, R.). No hostplant has been documented in Wisconsin, though *Vaccinium* and *Prunus* have been suggested (Ebner, 1970; Swengel, 1994). The butterfly has been reported in, and at the edges of, bogs in Wisconsin (Ferge, L.). Michigan habitats are reported as somewhat closed oak barrens, second-growth oak/pine forest, and in one case, oak barrens filling in with wild cherry (*Prunus serotina*), black oak (*Quercus velutina*), and maple-leaved viburnum (*V. acerifolium*) (MNFI, 2003). Nielsen identified *V. acerifolium* as the larval foodplant when encountering the species in second-growth aspen (*Populus grandidentata* and *P. tremuloides*), white oak (*Quercus alba*), and red maple (*Acer rubrum*) woods with scattered white pine (Nielsen, 1985). Swamp borders are mentioned (Nielsen, 1999) for Michigan, as are areas “near bogs” (Balogh, G.).

In Manitoba, Henry’s elfin has been found near Winnipeg in southeastern Manitoba. “The Butterflies of Manitoba” reports habitat as forest edges and openings, open pine woods, brushy areas and forest roads or trails where the larvae feed on *Vaccinium* (Klassen et al. 1989). In that publication, the first collection site for the species in the province is called an aspen glade. However, the site is actually dominated by jackpine where the species may be encountered congregating on damp patches of trail or gravel road (Royer, R.; Westwood, R.). This is the primary habitat of the Sandilands Provincial Forest, a very large reserve of former beach ridges of Glacial Lake Agassiz. Lesser amounts of spruce, tamarack, cedar, and balsam fir are present and, in some areas, hardwoods. Many swamps and bogs are nearby.

## North Atlantic

From Florida north to Nova Scotia the butterflies are found often in association with wetlands. Redbud, the main foodplant in much of the range, is not native from New Jersey northward and is restricted to ornamental plantings. “The Butterflies of Canada” (Layberry, et al. 1988) however, only lists habitat as open deciduous woods or dry, open pine woods. In Nova Scotia, Henry’s is reported using *Vaccinium* for the larval foodplant in both dry sandy areas and in small “sheltered” bog habitat (Bridgehouse, D.). In southern New Brunswick, they are found at the edge of sphagnum bogs using *Ilex* (*Nemopanthes*) *mucronata* and larvae have been reared on this species of holly (Thomas, T.). Massachusetts reports Henry’s from the northeast and central portion of the state in or near shrubby bogs and forested swamps with *Vaccinium* and *Gaylussacia* (Nelson, M.). In the Boston area the species uses *Rhamnus* sp. (Schweitzer, 1987). In the late 1980s most or all regional populations appeared associated with the exotic *R. frangula* or *R. cathartica*. Habitats were variable but were mostly mesic to hydric forests or edges. No other foodplants are documented from the area, although *Nemopanthes* is

North Atlantic	Rank
Nova Scotia	S?
New Brunswick	S1
Maine	S3
New Hampshire	S2
Vermont	SX
Massachusetts	S3
Rhode Island	S1
Connecticut	S1
Eastern New York	S2
New Jersey	S3

abundant at one site (Schweitzer pers. com., 2003) and is the most plausible candidate for a pre-*Rhamnus* foodplant.

In Rhode Island, *henrici* was recorded in numbers at three locations where American holly abounds. The larval foodplant is probably *Ilex opaca* in the Great Swamp area, at least. There is, however, a location in the central part of the state where *henrici* was recently recorded from a hardwood wetland with no holly present anywhere in the area (Pavulaan, H.). The habitat and biology of extirpated northern New Jersey colonies will probably never be known nor is much known about the species in New York. Neither red bud nor holly, were available in the New Jersey area though *Ilex (Nemopanthes) mucronata* might have been.

### Mid and South Atlantic

In southern New Jersey, the habitats are usually mature, shrubby forests with abundant understory holly. Henry's spends most of its time in the forest on and near subcanopy hollies but also can be found on the ground especially when newly emerged or on cold mornings in small clearings or along paths (Schweitzer, D.) and is very commonly at flowers of red maple and blueberry. Adults also sip from wet soil on hot afternoons. *Ilex opaca* is the only documented foodplant used along the coast (Gochfeld and Burger, 1997). Henry's elfin is rare to absent in the Pine Barrens region except southward where holly is abundant. *Vaccinium* as the larval foodplant in the Pine Barrens is unlikely though adults conduct mating activities about nearby flowering highbush blueberry (*Vaccinium corymbosum*) shrubs in Cape May Co., New Jersey (Pavulaan, 1998). Perching however, is almost always on holly or other evergreens such as pines or mountain laurel in that region (Schweitzer, D.).

Mid/South Atlantic	Rank
Southern New Jersey	S3
Delaware	SU
Maryland	S4
District of Columbia	SU
Eastern Virginia	S4
North Carolina	S4
South Carolina	S4

Along the coastal plain states, the butterfly may be found in varied landscapes from dry upland hardwoods to the coastal plain flatwoods with loblolly pine (*P. taeda*) or pond pine (*P. serotina*) with a shrubby understory and the edges of swamps and the evergreen-dominant shrub bogs known as pocosins (LeGrand,H.).The type locality for subspecies *viridissima* on the Outer Banks of North Carolina is a maritime thicket well protected from strong offshore winds by mature loblolly pines. The thicket is dominated by eastern red cedar, blueberry, American holly, and black cherry. Yaupon holly is also present (Pavulaan, 1998). Mainland populations up to Delaware Bay including most of New Jersey use primarily *Ilex opaca*, while *Ilex vomitoria* is available on the coastal islands. In South Carolina, subspecies *yahwehus* uses *Ilex opaca* inland. This species can grow in drier environments than does *Ilex vomitoria*, the larval host of subspecies *yahwehus* along the coast (Gatrelle, 1999).

## Deep South

Specimens collected by John Abbot in the 1800's in coastal Georgia and later identified as *henrici* came from swampy areas (Scudder, 1889). Abbot recognized the use of redbud as a nectar source only. *Ilex* is the dominant larval host in these states. *Ilex cassine* grows in wet areas along the coastal plain and is the primary foodplant of subspecies *margaretae* in east coastal Florida. *Ilex cassine* and *I. vomitoria* both grow along the coast west into Mississippi. *Ilex opaca* also ranges westward into Mississippi but tolerates drier situations so may be used by inland populations. Subspecies *margaretae* was described from individuals in the forested area of central Florida with abundant *Ilex cassine*. In these areas the butterflies nectar on flowers of willow and may be seen high in pine trees (Gatrelle, 1999). Subspecies *yahwehus* is present in the Florida panhandle and eastern Georgia near Savannah. It likely follows *Ilex* westward to at least Mississippi and perhaps into Texas. The states of Mississippi, Alabama and Georgia have occurrences of Henry's elfin but the state heritage programs had no information to offer concerning habitat, relative abundance or conservation.

Deep South	Rank
Florida	S4
Georgia	S4
Alabama	SU
Mississippi	S?

## NATIONAL FOREST DISTRIBUTION

Crawford, Oscoda, and Newaygo counties in Michigan have occurrence records for Henry's elfin within the Huron-Manistee National Forest (NF) (Ennis, K.). See Appendix D. Although there is a record in Iron County, MI. there are no records for the Ottawa National Forest (Dunlap, S. in Evans, R. 2003). The author has no information for the Hiawatha NF. Minnesota has no occurrence records for the Superior National Forest (Lindquist, E.) and there are no records for Henry's elfin in the Chippewa NF (Williamson, A.). There is a 1936 record from Cass County, MN which cannot be pinpointed to the Superior National Forest (Huber, R.).

In Wisconsin, there are two sites within a large wetland area of the Chequamegon-Nicolet NF – the Riley Lake Wildlife Management Area in Price County. A record from Marinette Co. about 8 miles east of the border of the Nicolet (Marinette-Forest Co border) is from 1993 in the Dunbar Barrens, a Wisconsin State Natural Area described as a northern oak/pine barrens (WDNR, 2002). During the field season of 2002, a limited search was conducted in the Nicolet but no Henry's elfins were found. The search was conducted between 19 May and 30 May primarily in sandy areas in parts of Oconto County near Thunder Mountain (Brust, M.). These dates cover the period of the peak flight season for the species in northern Wisconsin (Swengel and Swengel, 2000).

## RANGE WIDE STATUS

The Global Heritage Rank of Henry's elfin is G5 (2 May, 1999), “demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery” (NatureServe, 2002). National rankings are N5 for the United States and N4 for Canada. There is no ranking information available for Mexico, where a single occurrence of *solatus* has been documented (Durden, 2003). The species can be quite common in the Appalachian

states and the coastal plains south of New Jersey. Although at the northern periphery of the range the species may be expected to be less commonly encountered, the uncertainty of what habitats to survey contributes to the lack of reports from areas where butterfly monitoring programs are in place. At the western edge of the range, the open grasslands of the Great Plains halt expansion of the species in that direction. On the Edwards Plateau and Llano Uplift of central Texas *turneri* is usually abundant and often swarms (35-year records of Durden). Schweitzer allows that the two recognized subspecies, *solatus* and *margaretae*, may be rare (NatureServe, 2002) and ranks *solatus* G5T2T3 with N2N3 the National Rank. In the Balcones Canyonlands of central Texas *solatus* often swarms but may have poor years (35-year records of Durden). *Yahwehus* and *viridissima*, depending on the extent of the range of these subspecies, would be ranked T4 (Schweitzer, D.). The populations in the northern Midwest and perhaps southeastern Canada that feed on neither *Cercis canadensis* nor *Ilex* sp. may eventually be classified as another subspecies and similarly considered rare on that basis. The Ottawa Valley Pine Barrens populations were local and small in the middle of the last century, as was one south of Lakehurst, New Jersey (Durden).

The results of this survey of Heritage Programs and lepidopterists throughout the range lead to the conclusion that the G5 rating is appropriate for the species. Where the butterflies have begun to use the exotic buckthorn species for host plants, the populations are expanding and there appears to be few threats to those using redbud and holly. However, 11 states and two provinces have no rank for the species or rank it SU, possibly in peril but status uncertain. Three more states rank it S4?, probably indicating it is thought to have many occurrences and is secure but has not been carefully reviewed. That is 12 of the 40 jurisdictions (ignoring Mexico) that really don't know the status of the species.

U.S. & Canada State/Province Heritage Status Ranks (NatureServe)	
United States	Alabama (SU), Arkansas (S?), <b>Connecticut (S1S2)</b> , Delaware (SU), District of Columbia (SH), Florida (S4), Georgia (S4?), Illinois (S4?), Indiana (S?), Iowa (S3), Kansas (S3), Kentucky (S4), Louisiana (SU), Maine (S3), Maryland (S4), Massachusetts (S3), <b>Michigan (S2S3)</b> , Minnesota (S?), Mississippi (S?), Missouri (S4), <b>Nebraska (S2)</b> , <b>New Hampshire (S2S3)</b> , New Jersey (S3S4), New Mexico (S?), <b>New York (S2S3)</b> , North Carolina (S4), Ohio (SU), Oklahoma (S?), <b>Pennsylvania (S2S3)</b> , <b>Rhode Island (S1S2)</b> , South Carolina (S4?), Tennessee (S5), Texas (S?), Virginia (S4), West Virginia (S4), <b>Wisconsin (S2)</b>
Canada	Manitoba (S4), <b>New Brunswick (S1?)</b> , Nova Scotia (S?), Ontario (S4), Quebec (S?-3)

## GREAT LAKES STATEWIDE STATUS

The records obtained from the Natural Heritage Programs in Wisconsin and Michigan are described in the table in Appendix E. Minnesota has not ranked the species and the sites listed are from Ron Huber at the University of Minnesota, Minneapolis, MN. Additional sites may be known from these states but location information has not been released to the state agencies. Maple-leaved viburnum has been verified as a food plant in Michigan but not in the other states. Information on habitat and larval food plants is minimal or non-existent and research is greatly needed to clarify the status of the species in this part of the range. The following rankings are from the NatureServe website.

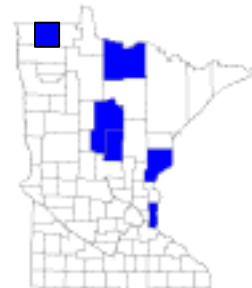


Henry's elfin has been collected in 12 counties in Wisconsin (ButterflyNAM, 2002). It is the least encountered of the five elfin species in the state. However, heavily forested and bog habitats have not been covered. Surveys have been primarily conducted in concert with Karner blue (*Lycaeides melissa samuelis*) and frosted elfin (*Callophrys irus*) surveys in barrens habitat. From 1987-1999, only 30 individuals were recorded from 20 sites in the state (Swengel and Swengel, 2000). These sites were chosen, and transects walked, in habitats strongly biased toward jackpine barrens with wild lupine (*Lupinus perennis*), the foodplant of Karners and frosted elfins. There are twenty Henry's elfin sites recorded in Wisconsin and, thanks to the attention given to Karner blue butterflies, all these records are from within the last 25 years and most within the last 15 years. Wisconsin ranks the species S2, imperiled because of rarity, only 6-20 occurrences, making it vulnerable to extirpation from the state.



In Michigan, Henry's elfin has been recorded from 19 counties and perhaps one more that is yet to be confirmed (ButterflyNAM, 2002). Michigan Heritage has eight records, two of which are within the last 25 years (MNFI, 2003). A recent occurrence from Otsego County is yet to be recorded with MNFI (Nielsen, M.). Michigan ranks the species S2/S3, rare and uncommon, certainly less than 100 occurrences and perhaps less than 20 occurrences making it vulnerable to extirpation from the state. Many of the counties mapped may only be sites of historical occurrence.

In Minnesota, Henry's elfin has been found in five counties of the northeastern portion of the state (ButterflyNAM, 2002) and along the Canadian border in the northwest (Cuthrell, 1991). There are seven recorded locations, three verified in the last 25 years old. Minnesota does not have enough information on the species to rank it.



## GREAT LAKES PROVINCIAL STATUS

In nearly all cases, Henry's elfin sites are near large cities in the provinces of Manitoba, Ontario, and Québec. Manitoba has given the Henry's elfin a ranking of S4, apparently secure with many occurrences (more than 100). This is based on the assumed amount of habitat that is available to be occupied. However, the butterfly only occurs in two places, the city of Winnipeg and the Sandilands Provincial Park. The larval food plant is unknown, the provincial park is immense with communities from barrens to bog that are part of the Canadian Mixed Deciduous Forest Zone, and apparent security of the species based on such a small amount of information is wishful thinking.

In Ontario, the primary sites of occurrence are near Ottawa where the butterflies occupy natural habitats and have begun populating woodlots and abandoned pastures where glossy buckthorn has spread. As a result of the use of exotic buckthorn, the number of occurrences is greatly expanded in Ontario, at least near Ottawa. In its natural habitats, the butterfly is

very local and uncommon with three locations in northern Ontario above Lake Superior. Henry's elfin was given an S3 ranking prior to this expansion and now is considered to be apparently secure.

In Québec Henry's elfin is found primarily in the St. Lawrence River valley from the city of Québec to Ottawa. The number of locations is not available but collections follow Highway 20 down the corridor and the range of the butterfly is said to extend about 12km south of the city. In 1989 Henry's was found in very large numbers but that is not always the case and recent building of cranberry bogs has reduced the habitat in the valley. The rank is tentatively S3, rare and uncommon, between 20 and 100 occurrences. The species is known to use *Ilex mucronata* in the Québec area where it is common in the marshes.

## POTENTIAL THREATS

Henry's elfin populations are generally widespread though localized, in the southern part of the range. In some states *henrici* is the most commonly encountered elfin. Habitat loss might become a future concern for coastal subspecies as unprotected habitat is pressured by development. Even uncontrolled overuse by park visitors could threaten the longterm existence of quality habitat on the barrier islands. In Massachusetts the species may be uncommon but can reliably be found in its habitat and in New Jersey there is no concern for Henry's elfin (Schweitzer, D.) in part due to it being widespread and not especially local where some colonies occupy more than 1000 acres of public and conservation lands. Highly populated states such as Florida are seeing immense changes in habitats, extensive highway expansion and loss of unprotected butterfly sites to development (Pulver, 2002). The rate of property development in the United States today is a threat to not only natural habitats but the marginal habitats that support remnant populations of butterflies in many areas.

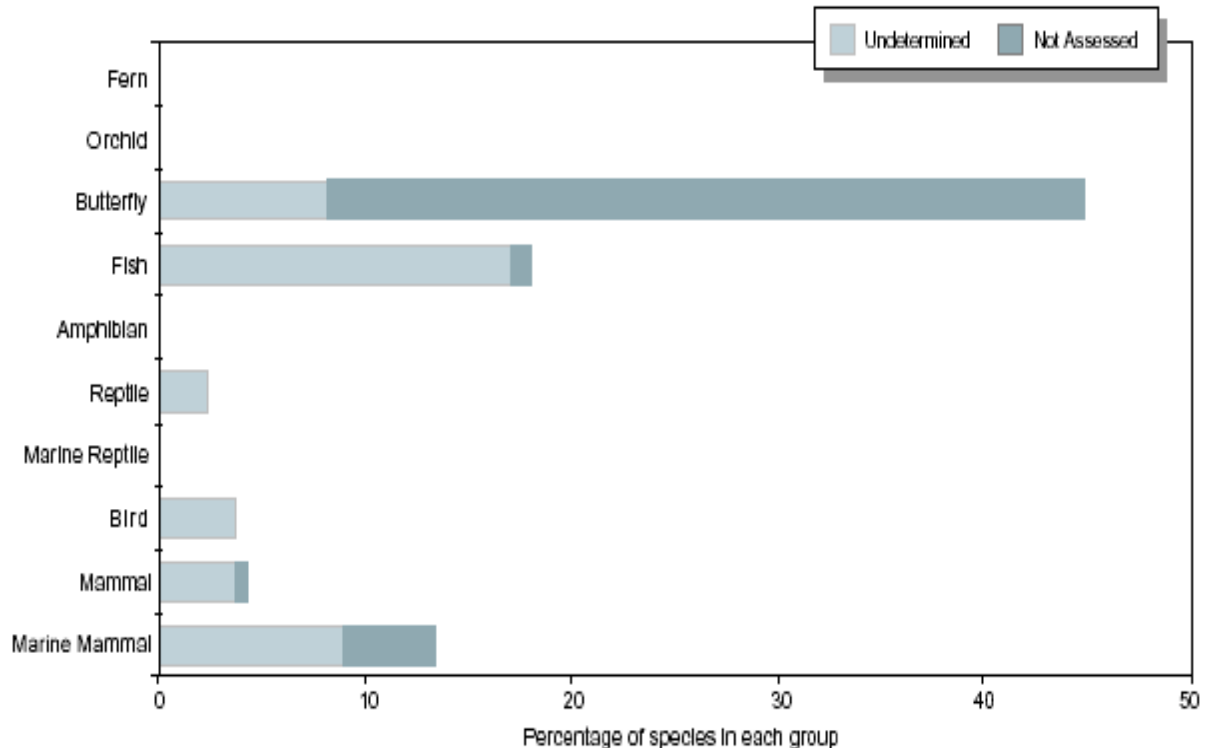
Where redbud is the larval food plant, loss of habitat is of little risk since redbud will flourish when the forest canopy is opened and will survive in woodlots and in urban areas. In central Texas redbud has declined in the last 20 years through gathering of wild shrubs for planting in the expanding suburbs of Austin. The limestone canyon habitat in the same area protects the foodplants of *solatus* in inaccessible pockets where the adjacent land is developed for housing. Habitat loss could become a problem where woodlands are left without the benefit of fire or other forms of management to create openings for subcanopy species. Where the habitat is mesic forest as in the Piedmont of North Carolina, timber harvesting, and development is contributing to some habitat loss (LeGrand, H.). Wetland habitats in the state are being drained and converted to pine plantations.

In the northern portion of the range, it is a problem to assess the status and abundance of a species without knowing the host plant in a given area. Although the Canadian provinces hold thousands of square kilometers of wilderness, much of it is unexplored by lepidopterists and the forests and wetlands of even those areas are not without pressures.

Near the Sandilands Provincial Forest in southeastern Manitoba, development pressure is a concern (situated close to the city of Winnipeg) as well as increased logging through the forests of that province. The status assigned to the species indicating that it is widespread and



abundant in Manitoba is in conflict with the knowledge that Henry's has only been found in two locations in the province. The following graphic from a recent publication by the Canadian Endangered Species Research Council expresses the problem:



“With our vast landscape and large number of wild species, it is not surprising that for some species we simply have too little information to evaluate their status. As much as 42% of the 284 extant butterfly species are poorly known across Canada, and this, combined with the fact that 5 provinces and territories were unable to assess the status of their butterfly species, makes butterflies the least well known taxon considered in this report. Our current lack of knowledge regarding the status of butterflies suggests a possible focus for future surveys and research”. -Wild Species 2000: The General Status of Species in Canada (CESCC, 2001)

In Quebec, there seems to be plenty of habitat yet the species is rarely encountered. Past fires cleared large areas of dense canopy, and blueberries and other shrubs were able to flourish. Where fire is controlled, the shrubs are not rejuvenated and the older plants do not flower as readily. For species that may be dependent on flowers and not vegetative growth, habitat becomes reduced. Quebec is also seeing the conversion of hundreds of hectares of natural habitat to commercial cranberry bogs. If Henry's is as closely connected to bog habitats as some describe, the peat moss industry also may have an increasingly deleterious effect on availability of habitat.

Almost all forest Lepidoptera that are in the first two instar larval stages in spring are threatened by non-specific spraying of *Bacillus thuringiensis* (Bt) to control gypsy moths (*Lymantria dispar*). Butterfly larvae are known to be highly sensitive to the bacterial insecticide. Aerial spraying covers large areas of oak forest. Spraying is timed, when oak

leaves are about 40-50% expanded, to hit the most first and early instar gypsy moth larvae. There is significant pressure from the public to control gypsy moth infestations, especially in residential areas and in nurseries and Christmas tree plantations in Wisconsin and Michigan.

One alternative to Bt to slow the spread of gypsy moths is pheromone flakes that are specific to the gypsy moth and serve to disrupt mating and fertilization of females. This method of control is primarily used for isolated colonies as the quantity of pheromone required is financially prohibitive for large areas. Another desirable alternative to generalized insecticide spraying is the use of Gypchek, a formulation that spreads a viral disease specific to the gypsy moth (Diss, 1998). The problem for Henry's elfin is that the location of populations is unknown in most of the northern range and the species is, in most cases, without legal protection that would require review of spray plans prior to treatment. The federally-listed Karner blue butterfly has enjoyed such review in Wisconsin and Michigan, and Henry's elfin populations in barrens habitat where the Karner resides may have been protected as well. However, if Henry's is actually a forest resident and the observations have been primarily of strays out of the mating habitat, then the target spray blocks for gypsy moth are also potential habitat for *henrici*. Spraying programs have been in place for many years in the northeastern states and the effects on Henry's elfin cannot be ascertained due to the lack of baseline population data and ecological information on the species across the north.

## **SUMMARY OF EXISTING POPULATION OR HABITAT PROTECTION**

No information was presented in the course of this investigation on management activities or conservation specific to the protection of Henry's elfin populations. In most of the range, the species is assumed or documented to be secure. In those locations where *henrici* is ranked Special Concern in the state, populations may be tracked by the Natural Heritage Program and, as in Wisconsin, the known locations are considered for avoidance within the requisite environmental review process in response to permit applications for development, road building, or other activities that require permits and could negatively impact habitat of rare species. However, unlisted species (neither considered Threatened or Endangered in the state) do not enjoy the legal protection that may be in place to protect those state-listed species.

In Wisconsin, Henry's elfin is afforded some protection of habitat where it occurs in Karner blue butterfly habitat. The Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan (WDNR, 2000) is a statewide agreement of governmental, forest industry, and other public and private partners to protect and enhance KBB habitat throughout the state. Henry's might be protected in oak barrens in Michigan for the same reason of protecting habitat of the Karner blue butterfly, and in jackpine forest where Kirtland's warbler is present.



## RESEARCH AND MONITORING

### Existing Surveys, Monitoring, and Research

A few researchers have raised Henry's elfin butterflies from ova or larvae. Pavulaan started feeding the larvae of *Ilex*-eaters on *Ilex*, then transferred them to *Cercis canadensis* leaves after two weeks. A high percentage of the pupae either did not produce adults or those that did emerge were aberrant. Females would not oviposit on *Cercis* in captivity but readily did so on *Ilex* (1998). Building on this research, Pratt and Pierce (2001) raised larvae collected on *Ilex* on flowers or leaves of *Cercis canadensis*, *Ilex opaca*, or *Prunus serotina*. The larvae grew largest and fastest on *Cercis* flowers and more larvae survived to adulthood. Larvae developed most slowly on *Prunus*. These results suggest that the species is a generalist that has made adaptations to locally available food plants. Larvae have been raised on *Nemopanthus mucronata* in New Brunswick (Handfield, 1999), *Vaccinium acerifolium* in Michigan (Nielsen, 1985), and *Rhamnus frangula* and *cathartica* in Ontario (Layberry, 1987; Catling, et al. 1998) and Schweitzer (1987) reported both successful rearing and field oviposition on the former in Massachusetts. Many have confirmed the use of both redbud and holly in many states, though not in the upper Great Lakes region.

A few states have butterfly monitoring programs in place but the success of these efforts to register the presence of a localized species such as *henrici* is minimal. Monitoring has been conducted each year since 1988 in barrens habitat in Wisconsin by the Swengels and the numbers of *henrici* observations were insufficient to be subjected to population analysis or monitoring (Swengel and Swengel, 2000).

### Research Priorities

#### A. Northern Populations

1. Rank the species initially as Special Concern in the north and begin surveys to determine how rare Henry's elfin is in the northern part of the range. Recommended rankings based on the information in this paper are S3? in Minnesota, S2 in Manitoba and Quebec, S1 in New Brunswick and Nova Scotia, and SU/SX in Vermont.
2. Identify locations of extant populations across the northern range.
3. Identify the larval food plant(s) of the northern populations.
4. Identify the breeding habitat of the northern populations.
5. Map potential habitat, assess threats, and reconsider status.

6. Establish a program to monitor existing populations.
7. Conduct research to assess the accuracy of the habitat model and identify new populations.
8. Reconsider status.
9. Clarify taxonomy for the northern populations to determine if there is more than one subspecies represented.
10. Reconsider status.

## **B. Rangewide Information Needed**

1. Establish pupation location.
2. Does the species cycle through population flushes? If so, what triggers this?
3. How does the species disperse? How far does it range? Do open habitats create barriers to dispersal?
4. Food plant mysteries:

Has redbud use in North Carolina been documented?

Texas bluebonnet in Texas? Anomaly?

Holly in the Susquehanna in Pennsylvania is unlikely but one in the Susquehanna Valley should be checked.

The wetland in Rhode Island could have holly present or what other foodplant?

No redbud at moist forest Nebraska site?

*Vaccinium* used in Missouri?

What plants are being used in the blend zone of central Texas?

Yaupon users in southeast Texas? Are these *yahwehus*?

Validate the record if needed and find what plants are used by the northern Ohio population in Erie Co.? This could be very useful information.

Is wild plum used as a host plant in Pennsylvania? Or maybe *Prunus pumila* or *P. pennsylvanica*?

Is wild plum used in southern Ontario?

Where else is the species using *Ilex mucronata* besides eastern Canada? Was this the pre-Rhamnus foodplant in the Boston area?

Is blueberry used in Canada? Minnesota? Florida? Maine? Or actual field evidence of use anywhere?

Is serviceberry or wild cherry being used in Minnesota or Wisconsin? Consider *Prunus pennsylvanica* or *P. pumila*.

Where are populations in which the species is using more than one genus of larval foodplant?

Do Rhamnus feeders still also use their native foodplant?

Where else is maple-leaved viburnum being used other than in Michigan?

What food plants are used by *henrici* in interior Carolinas?

5. How many metapopulations are present in Sandilands Provincial Park in Manitoba?
6. Verify the presence of Henry's elfin in Cook County in northern Illinois?
7. Is *yahwehus* in coastal areas of Louisiana, Alabama, and Georgia?
8. What is known about the butterfly in Louisiana, Arkansas, Mississippi, Alabama, northern Georgia, Tennessee, Kentucky, and Indiana?
9. *Solatus* is strongly associated with foodplants different than that of neighboring Henry's elfins. Is *solatus* a separate species?

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## APPENDICES

### A: SUBSPECIES BY STATE

State/Province	Rank	Subspecies
<b>NORTHERN MIDWEST</b>		
<b>Manitoba</b>	S4	henrici
<b>Ontario</b>	S4	henrici turneri? 2 3
<b>Quebec</b>	S?	henrici
<b>Minnesota</b>	S?	henrici
<b>Wisconsin</b>	S2	henrici turneri?2
<b>Michigan</b>	S2	henrici
<b>APPALACHIAN</b>		
<b>Pennsylvania</b>	S1S3	henrici south in SusquehannaR: Ilex? 7
<b>Western Virginia</b>	S4	henrici
<b>West Virginia</b>	S4	henrici
<b>Kentucky</b>	S4	henrici
<b>Tennessee</b>	S5	henrici
<b>NORTH ATLANTIC</b>		
<b>Nova Scotia</b>	S?	henrici
<b>New Brunswick</b>	S1	henrici
<b>Maine</b>	S3	henrici
<b>New Hampshire</b>	S2	henrici
<b>Vermont</b>	SX	henrici
<b>Massachusetts</b>	S3	henrici
<b>Rhode Island</b>	S1	henrici, coastal: viridissima? 2
<b>Connecticut</b>	S1	henrici, coastal: viridissima? 2
<b>Eastern New York</b>	S2	coastal: viridissima? 2
<b>New Jersey</b>	S3	henrici, coastal: viridissima 2
<b>SOUTHERN ATLANTIC</b>		
<b>Delaware</b>	SU	viridissima 2
<b>Maryland</b>	S4	viridissima 2
<b>D. C.</b>	SU	viridissima 2
<b>Eastern Virginia</b>	S4	viridissima 2
<b>North Carolina</b>	S4	inland: nonIlex group?9 upper outer banks: viridissima 3 2 southcentral: yahwehus 2 3



<b>South Carolina</b>	S4	coastal: yahwehus 2 3 northern: henrici
<b>DEEP SOUTH</b>		
<b>Florida</b>	S4	western: yahwehus? 2 east coast/south central: margaretae 2
<b>Georgia</b>	S4	northern: henrici central: yahwehus?2 3
<b>Alabama</b>	SU	coastal: yahwehus?2 3
<b>Mississippi</b>	S?	coastal: yahwehus?2 3
<b>CENTRAL</b>		
<b>Illinois</b>	S4	turneri
<b>Indiana</b>	S?	turneri
<b>Ohio</b>	SU	henrici
<b>WESTERN</b>		
<b>Nebraska</b>	S2	turneri
<b>Iowa</b>	S3	
<b>Kansas</b>	S3	turneri
<b>Missouri</b>	S4	turneri
<b>Oklahoma</b>	S?	turneri
<b>Arkansas</b>	S?	
<b>Louisiana</b>	SU	turneri
<b>Texas</b>	S?	central/eastern: turneri 8 eastern: Ilex group? 8 central/south :solatus 4 central/south: species D.solata solata 8
<b>New Mexico</b>	S?	solatus 4 species D.solata subsp. 8
<b>Coahuila, Mexico</b>		solatus 8

1 Shapiro, 1966 2 Gatrell, 1999 3 Pavulaan, 1998 4 Scott, 1986

5 Gatrell 2003 7 Ray, Betsy 2003

8 Durden, Chris 2003 9 Emmitt, Randy 2003

## APPENDIX B: LARVAL FOODPLANTS

Food plant & Family	Common Name
<b>Rosaceae</b>	
<i>Prunus americana</i>	wild plum <sup>1 4 6 7 8</sup>
<i>Prunus pennsylvanica</i>	wild cherry <sup>3 14</sup>
<i>Amelanchier sp.</i>	serviceberry <sup>11</sup>
<b>Fabaceae</b>	
<i>Cercis canadensis</i>	*redbud <sup>10</sup>
<i>Lupinus texensis</i>	Texas bluebonnet
<i>Sophora secundiflora</i>	*Tx Mt.laurel <sup>10</sup>
<b>Cyrillaceae</b>	
<i>Cyrilla racemiflora</i>	swamp cyrilla <sup>3</sup>
<b>Aquifoliaceae</b>	
<i>Ilex opaca</i>	American holly
<i>Ilex cassine</i>	dahoon
<i>Ilex vomitoria</i>	yaupon <sup>10</sup>
<i>Ilex coriacea</i>	gallberry <sup>13</sup>
<i>Ilex mucronata</i> ( <i>Syn.Nemopanthis</i> )	*mountain holly <sup>12</sup>
<i>Ilex verticillata</i>	Michigan holly <sup>2</sup>
<b>Sapindaceae</b>	
<i>Ungnadia speciosa</i>	Mexican buckeye <sup>10</sup>

<b>Rhamnaceae</b>	
<i>Rhamnus frangula</i>	*glossy buckthorn
<i>Rhamnus cathartica</i>	buckthorn <sup>4</sup>
<b>Ericaceae</b>	
<i>Vaccinium sp.</i>	blueberry <sup>1 4 5 7 9 10 14 15 16</sup>
<i>prob.V. corymbosum</i>	
<i>prob. V. angustifolium</i>	
<i>Gaylussacia baccata</i>	huckleberry <sup>3 15</sup>
<i>Leucothoe racemosa</i>	sweet bells <sup>3</sup>
<b>Ebenaceae</b>	
<i>Diospyros texana</i>	Texas persimmon <sup>10</sup>
<b>Verbenaceae</b>	
<i>Verbena sp.</i>	vervain <sup>10</sup>
<b>Caprifoliaceae</b>	
<i>Viburnum acerifolium</i>	*maple-leaf viburnum
<i>Viburnum cassinoides</i>	wild raisin <sup>2</sup>
1.Shapiro, 1966 2.Nielsen, 1999 3.Scott, 1986 4. Layberry, 1987 5. Holmes, et al.1991 6. Scudder, 1889 7. Heitzmans, 1987 8. Spomer, S. 9.Bridgehouse, D. 10. Durden, C. 11. Huber, R. 12.Webster, R. 13. LeGrand, 2002 14.LaPlante, 1985 15. Nelson, M. 16. Ebner, 1970 * larval use confirmed.	

## APPENDIX C. INFORMATION ON LARVAL FOOD PLANTS

### American holly

*Ilex opaca*, Ait.

**Aquifoliaceae**

#### Species Summary:

American holly makes its best growth in the understory of coves, on rich, well-drained soils, but it occurs on a wide range of sites from bottoms to dry, rocky soils.

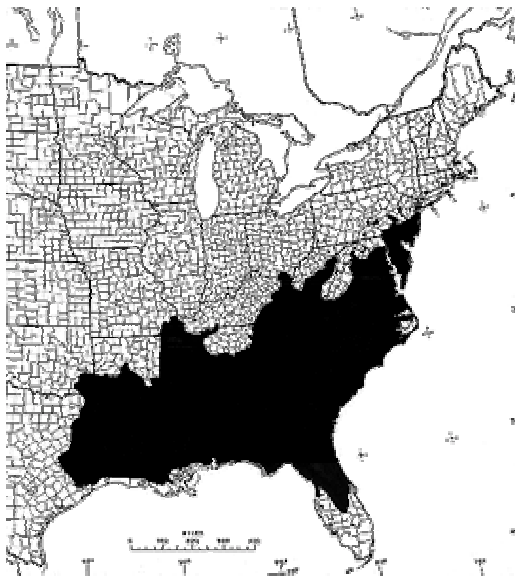
**Range:** southeast: Connecticut to c Florida, w to e Texas, Oklahoma, s Illinois

**Ecology:** American holly is a shade-tolerant understory species in most of its range, from rich, mesic sites to poor dry sands. It is very tolerant of competition, often thriving in deep shade. It is tolerant of salt, hence its common occurrence in coastal areas. On the Atlantic Coastal Plain, holly occurs in dry, sandy soils mixed with oak or pine.

**Life History:** American holly is semi-dioecious, with some plants producing only male flowers, some producing only females, and others producing both male and female flowers. The minute, fragrant flowers are borne in early summer, among the latest trees to flower, and seeds ripen in

bright red berries during late fall. Seeds are dispersed by birds, and germinate the following spring, or enter the seed bank. Like many understory species, growth of holly is slow.

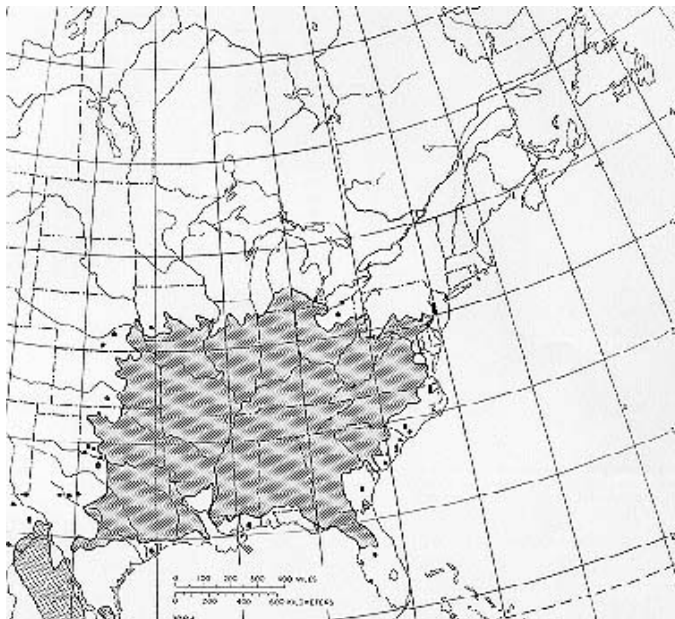
**Interactions:** Fruit is dispersed by birds and holly is an important early winter food source. Holly has few significant pests and pathogens in the wild, but is beset with problems in cultivation, particularly the native holly leaf miner which damages leaves of ornamentals.



*Cercis canadensis* L.  
**Eastern Redbud**

Leguminosae -- Legume family

Eastern redbud (*Cercis canadensis*) is a small, short-lived deciduous tree found throughout the eastern United States. Redbud is also known as Judas-tree. According to legend, Judas Iscariot hanged himself from a branch of the European species *Cercis siliquastrum* (13). Eastern redbud is a strikingly conspicuous tree in the spring because it flowers before other tree leaves form. The wood is heavy, hard, and close-grained, but because of the small size and irregular shape of the tree it is of no commercial value as a source of lumber. This tree is most valued as an ornamental and is extensively planted.



**Native Range**

The range of eastern redbud is from New Jersey and southern Pennsylvania northwest to southern Michigan, southwest into southeastern Nebraska, south to central Texas, and east to central Florida. A disjunct population of redbud extends from the Trans-Pecos and south Texas into Mexico.

-The native range of eastern redbud.

## **Climate**

A wide range of climatic conditions is present in the large geographical range of redbud. Mean annual precipitation is less than 510 mm (20 in) in dry south Texas and approximately 1270 mm (50 in) in moist central Florida. Mean annual snowfall in the northern perimeter of redbud is about 90 cm (35 in). Mean January temperatures vary from -8° C (18° F) to 16° C (61° F) within the native range of redbud. Mean July temperatures vary from about 21° C (70° F) in southern Pennsylvania to 26° C (79° F) in central Florida. Frost-free days can vary from 160 to 300 days.

## **Soils and Topography**

Redbud is found on a variety of sites ranging from xeric to mesic but grows better on moist, well-drained sites. It is normally more abundant on south-facing slopes where sunlight is more intense and there is less plant competition. This species does not usually grow on flooded sites because it cannot endure inundation or survive in poorly aerated soils.

The tree grows well in a variety of soil textures but is not found in coarse sands. It requires some fine or colloidal material. Redbud is tolerant of a wide pH range but grows best where the pH is above 7.5. It is prevalent on limestone outcrops and on alkaline soils derived from them. Redbud is tolerant of nutrient deficiencies. Therefore, less competition can occur from associated trees that are less vigorous on the nutrient deficient sites. In Indiana no relationship was noted between distribution of redbud and soil calcium or magnesium. Redbud is found on soils of most soil orders, but most commonly on those of the orders Alfisols and Mollisols.

## **Ecology**

Eastern redbud is a small understory tree of a wide variety of upland sites. It is moderately tolerant when young, but will not mature without adequate sunlight. Redbud is an indicator of disturbance. In forests, it is found in major gaps or forest margins. However, it can persist for considerable periods after canopy closure, and remnant trees in forests are good indicators of past disturbance.

## **Life History**

Redbud is among the first trees to flower in the spring, and turns disturbed sites into a lavender haze. Redbud is ramiflorous (bearing flowers and fruits on the branches), a rare trait in temperate trees. Seeds are ripe in autumn and dispersed throughout fall and winter. Reproduction is from seed and from root and stump sprouts; redbuds often occur in patches. Most of the insects that feed on redbud are said to be toxic. Redbud is not a nitrogen-fixing tree. Insect pollinated by honeybees; native pollinator unknown.

## Texas Mountain Laurel - *Sophora secundiflora*

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The Texas mountain laurel is perhaps the most handsome of the trees offered for water efficient landscaping. Each spring, this remarkable plant offers a spectacular display of wisteria-like flowers that hang in profusion from the branch tips. And the smell! You just can not believe a plant can produce an aroma this fragrant.

*Sophora secundiflora* is one of some 50 species within this particular genus, which is in the Fabaceae or pea family. It is also known as the mescal bean tree. To our friends south of the border it is known as the frijolito.



As the common name might suggest, this plant is native to the arid trans-Pecos region of central and south Texas and into New Mexico and northern Mexico. It is commonly found in limestone soils of hillsides and gulches from near sea level to elevations of 5,000 feet.

The Texas mountain laurel is a large evergreen shrub or small tree, which may eventually grow to a height of 25 feet or more. More typically it is found as a plant of smaller stature with a low branching habit or multiple trunks. The crown of the tree tends to be rather small in diameter. Growth is painfully slow until the plant becomes established, then becoming somewhat faster.

The compound leaves are about 5 inches in length and are comprised of 7 to 9 ovalish leaflets. Each leaflet is 1 to 2 inches in length, dark green and glossy. A cultivar known as 'Silver Peso' has silvery foliage. The most intriguing characteristic of the mountain laurel is the flowers. Each spring, starting in March depending on the weather, beautiful bouquets of violet flowers appear in large clusters that resemble those of the wisteria. The clusters, known as panicles, typically are 6 to 8 inches in length and contain numerous 1 inch, pea-shaped flowers. They are fragrant; very fragrant. The aroma reminds one of grape bubble gum or popsicles. Really! You have to try it to confirm this for yourself. There is also a white flowering form that is somewhat less common. Unfortunately, this one does not smell like vanilla.

The flowering cycle is followed by the emergence of silvery bean-like seedpods that are variable in length up to 6 inches. The woody pods are constricted between seeds creating a peanut-like appearance along the length. The seeds are bright red, which makes them quite attractive, particularly for use in making necklaces in areas where they are native. The one main drawback is the fact that they are extremely poisonous. Fortunately, the seed coat is extremely hard. Please beware when you place the tree if you have young children or pets. Otherwise remove all the pods before they mature.

The Texas mountain laurel is not picky about the type of soil, provided drainage is sufficient. High temperatures and alkalinity are not a problem either, which brands this plant a winner for southwestern gardens. In fact, growth seems to improve with higher temperatures. Summer water will also improve the overall appearance and the rate of growth. It is known to be hardy to around 10F.

*Sophora secundiflora* makes a fine patio or courtyard tree due to the lack of thorns, the slow growth, and the outstanding flower show each spring. Due to the less than rapid growth rate, most designers prefer larger specimens to fill the void. The Texas mountain laurel may also be used to create hedges, screens or in mass plantings. Plants should be spaced at 5 to 7 foot intervals if used en masse.

*Sophora* should be informally pruned, never sheared. Typically training cuts may be made while eliminating the poisonous pods. Lower branches may be removed to show the detail of the branches and to define a tree-like silhouette.

In addition to the Texas mountain laurel, a similar species may be desirable for one's landscape. *Sophora arizonica*, or the Arizona mountain laurel, is a native of the western and central Arizona hillsides. With smaller, more silvery leaves, this plant is a knock-off of the Texas species, with an even slower growth habit. The flowers are similar in color and fragrance.

## APPENDIX D. FOREST SERVICE SITES IN THE GREAT LAKES REGION

There are five sites on USFS property where Henry's elfin has been observed. Two are historical and the recent sites were recorded 1988-89, 1998, and 2002.



### Maple-leaf Viburnum, Dockmackie, Arrowwood, Possum-haw, Squash Berry, Guelder Rose

*Viburnum acerifolium* Caprifoliaceae

Maple-leaf viburnum ranges from East Texas to the Gulf of Mexico, east into Louisiana and Florida and north to Minnesota and Canada. It prefers woodland sands or rocky soil, moist or dry, and is drought tolerant in east Texas. Its thin, maple-shaped dull green leaves are pubescent (felty) on both sides and turn good fall colors, from dark purple to crimson, creamy pink and rose. White flowers on long-stalked, flat-topped inflorescences are followed by purplish black fruit (drupe) in the fall, which are relished by four species of birds. It was introduced into cultivation in 1736. There is a pink-flowering variety: forma *collinsii*. In the landscape this is a good plant for large heavily shaded locations in dryish soil where it can naturalize and form loose open colonies.

**Plant Habit or Use:** small shrub  
medium shrub

**Exposure:** partial sun  
shade

**Flower Color:** white

**Blooming Period:** spring  
summer

**Fruit Characteristics:** reddish or purplish black drupe

**Height:** 4 to 8 feet

**Width:** 3 to 5 feet

**Plant Character:** deciduous

**Heat Tolerance:** high

**Water Requirements:**

**Soil Requirements:** acid

neutral [USDA Hardiness Zone: 3](#)

[aggie-horticulture.tamu.edu/ornamentals/nativeshrubs](http://aggie-horticulture.tamu.edu/ornamentals/nativeshrubs)  
Texas Plant Database

## **Huron National Forest- Michigan**

Crawford County – T25N, R2W Sects. 5-7  
1932 – T26N, R2W Sects. 5-8, 20-21, 28-32  
The EO record also lists 7 additional townships: 25N, 3W and 4W;  
26N, 3W and 4W; and 27N, 2W, 3W, and 4W

There is no detailed information for this site but this portion of the national forest supports little or no oak. The forest stands are largely jack pine.

Oscoda County – T25N, R1E, Sect. 4 and T26N. R1E, Sect. 33  
30 May, 1954 “Oak Barrens”

The “oak barrens” is 40 acres of undescribed opening plus 20 acres of brush that was probably wetland prior to road building that cut the brushy section off from the tamarack swamp on the north side of the road. Forty-four acres of tamarack and white cedar lowland forest is immediately east and stretches northeast of the collection site, following a river corridor extending to the Au Sable River. The river (creek?) runs south through pockets of mixed conifer swamp. Forested areas within ½ mile to the east consist of red pine plantation interspersed with aspen. Immediately to the west of the openings is a strip of jack pine with scattered oaks and beyond within ½ mile are stands of black oak interspersed with aspen. In 1954, Henry’s elfin could have been in either the dry jack pine/oak community or the edges of the forested wetland.

## **Manistee National Forest – Michigan**

Newaygo County – T12N, R12W, Sect. 9, 10  
16 May 1988: 1 AD. 1989 “Somewhat closed canopy oak barrens”

The 30-acre brushy opening is on the east edge of black oak woods. This site is on a ridgetop with the land falling away on three sides to a large wetland area with scattered lakes and creeks flowing into the White River. The habitat on the ridge is primarily second-growth black oak and white oak forest with a 40- acre stand of red pine and a small stand of white pine. There are several small clearings with *Vaccinium* sp. The butterfly was observed “hovering about *Vaccinium*” sharing the clearing with a single *Rubus* plant.

## **Chequamegon-Nicolet National Forest – Wisconsin**

Price County – T39N, R2E, Sect. 13  
31 May 2002: Riley Lake Bog. Site is within a large wetland complex near Riley Lake.  
T39N, R2E, Sect. 23  
1 May and 15 May 1998: Riley Lake Road. Same area, within 3 miles of Riley Lake.



# APPENDIX E: TABLE OF SITES IN MICH. WIS. MINN.

ST	COUNTY	Town/Range	YEAR	DATE	SITE NAME	DESCRIPTION
MN	Cass		1936	16May		
MN	CrowWing	35-36N/27W	<b>1982</b>	22May	UpperMissionLk	sparse 2 <sup>nd</sup> growth hardwoods
MN	Koochiching	63N/26W	1967	16June	nr. Craigville	
MN	Pine		1964	16May	St.Croix StPrk	jackpine/oak barrens
			1967	21May	same	
			1968	10May	same	
	Roseau	59N/40W	<b>1991</b>	21 May	Palmville Bog	large wetland complex with rich fens and uplands of oak, aspen, <i>Corylus</i> , <i>Amelanchier</i>
MN	Roseau	64N/40W 63N/40W	<b>1991</b>	16-26 May	Pine Creek peatlands	bog/fen/conifer complex with scattered uplands
MN	Washington	31N/20W	<b>1980</b>	4 May	Camp Wilder	on Amelanchier oak forest opening
WI	Burnett	38N/19W	<b>1989</b>	27May	Crex Meadows	jackpine barrens nr. marsh
WI	Burnett	40N/18W	<b>1988</b>	26May	Reed Lakebarrens & meadow	roadside by oak forest, brush prairie
WI	Burnett	41N/15-16W 42N/14W	<b>1979-1996</b>	23May-29May	Namekagon Barrens	barrens/brush prairie, scrub oaks, <i>Ceanothus</i> , <i>Corylus</i> , <i>Salix</i> .
WI	Burnett	41N/15W	<b>1979</b>	27May	Airfield Rd	scrub oak/jackpine clearing
WI	Chippewa		<b>1970</b> <b>1977</b>	8 May 14 May		
WI	Douglas	42N/12-13W	<b>1989</b> <b>1994</b>	28 May 23 May		
WI	Eau Claire	26N/5W	<b>1999</b>	1 May	Pea Creek	sedge meadow
WI	Jackson	20N/3W	<b>1995</b>	15May	Millston Burn	jackpine/oak barrens
WI	Jackson	21N/2W	<b>1988</b>	17May	Dike 17	prairie/pine/oak forest edge
WI	Jackson	21N/2W	<b>1992</b>	6 June	Battle Pt.Ridge	jackpine/oak clearcut
WI	Jackson	21N/3W	<b>1996</b>	29May	Wazee Lake	pine/oak barrens restoration
WI	Juneau	18N/4E	<b>1980</b>	11 May		
WI	Marinette		1952	29 May	Crivitz	
WI	Marinette	37N/18E	<b>1993</b>		DunbarBarrens	pine/oak barrens
WI	Oneida	39N/10E	<b>1979</b>	6 June	Sugar Camp	bog
WI	Outagamie	23N/17E	<b>1990</b>	29Apr	Fallen Timbers	moist forest
WI	Portage	24N/8E	<b>2001</b>	29Apr.	Schmeekle Reserve	white pine/red maple/black oak forest blueberry (earlier records from swamp forest)
WI	Price	39N/2E	<b>1998</b>	31 May	Riley Lake	bog/sedge meadow area
WI	Waushara	20N/10E	<b>1999</b>	10 May	Wild Rose	jackpine/oak barrens
WI	Wood	21N/3E	<b>2000</b>	3 May	Hwy X	jackpine barrens habitat
MI	Oscoda	25-26N/1E	1954	30May		See Appendix D
MI		33N/2E	1967	20Jun		oak barrens
MI	Newaygo	12N/12W	<b>1988-89</b>	16May		See Appendix D
MI		11N/8W	1957-66	7 May		oak barrens
MI		11N/8W	<b>1979</b>	13May		opening in oak barrens
MI		3N/10W	<b>1986-87</b>			oak barrens
MI		8-9N/7-9W	1954	6 Jun		oak barrens
MI	Otsego		<b>2002</b>		<b>Bold = recorded within the last 25 years.</b>	
MI	Iron ?					

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Minnesota Natural Heritage Program, Minnesota DNR

Wisconsin Natural Heritage Program, Wisconsin DNR

Michigan Natural Features Inventory, Lansing MI.

Ottawa National Forest

Hiawatha National Forest

Chippewa National Forest

Superior National Forest

Huron-Manistee National Forest

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